U.S.Audio
whirlwind

OPERATIONS MANUAL

INTRODUCTION

Thank you for selecting the MPM1 V and the MPM1 music and paging mixers. These high quality, versatile mixers can be used in countless applications to provide simple, easy control of multiple audio and video sources. Features include three stereo inputs for audio connection of CD and cassette players, radio tuners, VCR and DVD players, etc.; two priority inputs which allow paging and automatic music override for announcements or a jukebox; and a four band equalizer for enhancing the overall sound of the system. The MPM1 V has three composite video inputs allowing VCR, DVD, cable and satellite box video switching simultaneously with the stereo audio. Both units have stereo and mono audio outputs and remote master volume control capabilities.

Housed in a single rackspace unit with removable rack ears and designed for continuous operation, the MPM1 includes all

UNPACKING

US Audio has made every effort to ensure that your equipment is received in the same perfect condition it was in when it left the factory. Please inspect your product for any signs of damage during shipping and report them to your dealer so that a claim can be presented to the shipper. We recommend that you save your packaging material for use in the unlikely event that you need to return your equipment for service.

MPM 1V
MPM 1
MUSIC PAGE MIXER

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THEORY OF OPERATION

Both the MPM1V and the MPM1 have three stereo RCA inputs, each with a front panel volume control and a pushbutton on/off select switch. These inputs serve as the normal signal inputs, usually used for music or program sources. They can be set at a predetermined level and then conveniently switched in and out to change the audio source (e.g. switching from VCR to tuner). The gain range of the level controls is from -60 to +20 dB allowing their use with a wide variety of audio inputs. There is also a buss input designed to receive signals from other outboard sources such as DJ or live sound mixers. There is no volume control for this input. Level can be adjusted with the master volume control or by varying the output of the source unit. Inputs 1-3 and the buss input (stereo) are summed and passed through a series of Voltage Controlled Amplifiers (VCAs) and summing amplifiers which comprise the priority circuitry.

The MPM1V has three RCA composite video inputs, which are switched in conjunction with the three audio inputs. The selected video input is delivered to a single RCA video output jack and the unselected inputs are terminated with 75 Ohm resistors.

Both mixers have two priority override inputs each with distinct features to provide capabilities for microphone paging and injecting signals into the audio chain (e.g. emergency announcements or a jukebox). There are two separate priority control circuits and the unit is shipped with the mic input as priority 1 and the stereo line input being priority 2. There are 6 user changeable jumpers inside which reverse the connections of the priority 1 and priority 2 control and audio circuits. All 6 jumpers must be moved to accomplish this. The intent of this feature is to give the stereo line input highest priority (priority 1) for emergency announcements and other such applications.

A set of jumpers in the left channel VCA control circuit provides another feature of the MPM1V and MPM1. Moving the jumpers on priority 1 and priority 2 disables the ducking of the left channel of the mixer. The audio signal from the priority inputs still goes through to the left output and can be disconnected by removing jumpers P1L and P2L. This arrangement provides the right channel with ducking for paging and the left channel for audio program only from RCA inputs 1-3.

The three normal program inputs and the buss input have no priority status, so they will be active as long as there is no audio signal present at the mic input (priority 1) or at the stereo balanced TRS line inputs (priority 2).

When the priority line receives audio at its inputs, the priority 2 VCAs turn off channels 1-3 and the buss input. The priority line audio signal is then injected into the audio path.

When the priority mic receives audio at its input, the priority 1 VCAs turn down the priority 2 input, channels 1-3 and the buss input to a level that is preset by the ducking level selector. The priority mic audio signal is then injected into the priority 1 sum amps.

The priority line inputs are left and right stereo TRS ¼" jacks which accept balanced TRS or TS unbalanced signal. A mono TRS or TS signal connected to the left input is normalled to the right and with nothing plugged in, the inputs are shorted to ground. The stereo signal is split to feed the detector of the voltage control circuit and to the priority line stereo volume control which has a range of -60 to +20 dB, allowing level adjustment of most audio outputs. The audio signal then passes through the headers to the sum amplifiers.

The priority line volume pot does not affect the signal applied to the detector control circuit. Since the volume control can be turned down enough to be off, it is possible to mute the normal program music by having signal present at the priority line input, but not hear it because the volume control is turned all the way down. When using the line priority input, the idle noise level (like a jukebox with no music playing) must be well below the fixed detector threshold of -20 dB to prevent false triggering.

There is a circuit board jumper in the detector circuit, which sets the release time of the priority line input. This switches the decay time from Normal (music is back to full volume in 3 seconds) to Slow (takes 30 seconds for music to be back to full volume).

The priority mic input is a female XLR connector which accepts balanced mic level signals and provides 18 volt phantom power for condenser microphones. The signal passes through a 120 Hz high pass filter which removes frequencies associated with rumble and handling noise and is split to feed the detector of the voltage control circuit and to the priority mic volume control which has a range of -40 to +45 dB, allowing level adjustment of most microphones. The audio signal then passes through the headers to the sum amplifiers.

The mic priority control circuit has two extra features; the detector is controlled by a ducking level switch and remote VC terminal. The ducking level controls the amount of volume decrease in the program material during pages and can be user set at -20, 0 or -70 dB. At -20 dB of ducking, the program signal will be turned down but will still be audible during pages. At -70 dB the background music will be silent during pages. At 0 dB the normal program audio will not change in volume during pages.

The volume control does not affect the signal level applied to the override detector. If the priority mic volume control is turned all the way down, the background music level will still be affected by speaking into the mic if ducking level is set to -20 or -70, but the microphone will not be heard. The detector threshold is fixed at -40 dB. A normal speaking voice will engage the priority circuit with most microphones. The page mic must have an on/off switch so that background noises will not false trigger the detector when not in use.

The remote volume control feature of the MPM1 allows the overall program level of the sound system to be adjusted from a location other than the mixer. It is part of the priority mic voltage control detector circuit, but is independent of the operation of the paging mic. With the mic input connected to priority 1, the remote volume controls all inputs to the MPM1 except the priority mic paging input. With the mic input connected to priority 2, the remote volume controls everything except the priority line input. Wired to the priority 1 circuitry, the priority line input is ideal for injecting emergency announcements into the system at a preset level.

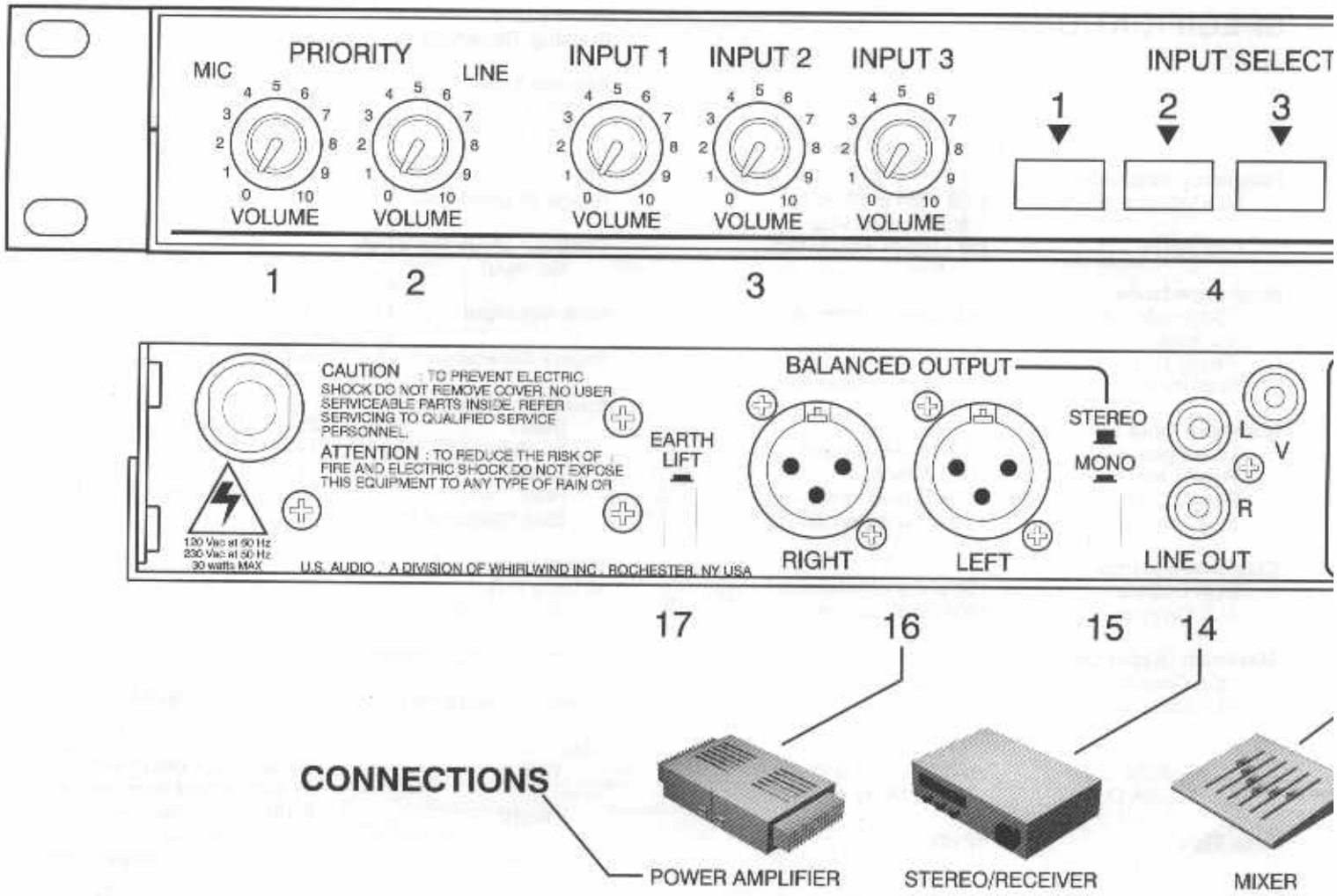
The remote volume control is accessed through a three position header and screw terminal plug. The three screw terminals are V+ which is +18 VDC power, VC (voltage control) wired to the wiper of the remote 10 k ohm linear potentiometer (or accepts any standard 5 or 10 volt VC) and ground (G). Whirlwind includes the remote volume control mounted to a single gang wallplate part # MPM1RV.

From the final sum amplifiers all audio passes through a stereo 4 band equalizer. The bass and treble controls are shelving type filters which enhance bass and treble on quality stereo systems. The low mid frequency control peaks at 250 Hertz which enhances upper bass in ceiling/wall mount type speakers. The high mid frequency control was chosen at 1.6 K Hertz to enhance voice frequencies.

From the equalizer section the audio signal passes through the stereo master volume control with a range of -60 to +20 dB, which is sufficient to drive most power amplifiers. The master volume control is after the remote volume circuit. When setting the maximum volume of a sound system utilizing the remote VC, the remote must be turned up all the way before adjusting the master for the desired maximum level.

The stereo output signal is actively split to the stereo RCA outputs and stereo balanced XLR outputs. Maximum output level is +23 dB. The RCA jacks are intended for connection to unbalanced stereo systems using a common dual RCA cable. The balanced outputs are 3 pin male XLR. A stereo/mono switch changes only the XLR jacks (RCA jacks are always stereo) to mono, for use in single channel ceiling speaker and background music applications, etc. In the mono configuration, the output level of the XLR jacks will drop 6 dB to accommodate the 6 dB of gain common with in phase stereo material. For unbalanced XLR outputs, use pin 2 as hot, pin 1 as ground and do not connect pin 3.

The power supply section of the MPM1 uses two power transformers and two sets of voltage regulators to keep operating temperatures at a minimum, providing dependable, continuous operation. Internal jumpers can be moved (soldering required) to change the primary transformers from 120 volts AC to 230 volts AC. The power on/off switch makes and breaks both hot and neutral of the power line. A power LED illuminates when the unit is on, and a ground lift switch (on the back panel) breaks the AC earth ground from the MPM1's audio ground.



CONTROLS AND FUNCTIONS

1. PRIORITY MIC VOLUME CONTROL varies the amount of the page mic signal that is applied to the master output of the unit. As shipped from the factory, the mic input is connected as Priority 1 which will override any other signal going through the mixer when it is activated. Turning the volume off does not affect the priority trigger, so leaving the page mic on with volume off could turn the system off unexpectedly.

2. PRIORITY LINE VOLUME CONTROL varies the amount of the priority line level signal that is applied to the master output of the unit. As shipped from the factory, the line input is connected as Priority 2 which will override the normal signal inputs when it is activated, but not the Priority 1 mic input. Turning the volume off does not affect the priority trigger, so leaving the volume off could mute the normal signal unexpectedly, resulting in no audio passing through.

3. INPUT VOLUME CONTROLS vary the amount of stereo input signal applied to the master outputs through the select switches.

4. INPUT SELECT SWITCHES connect the signal from the inputs to the master output.

5. MASTER VOLUME CONTROL sets the final overall volume of the MPM1 sources. All inputs and the remote volume control are affected by this output level control.

6. SYSTEM TONE CONTROLS allow
using the four band controls. The LOV
filters. The LO MID and HI MID are peakir

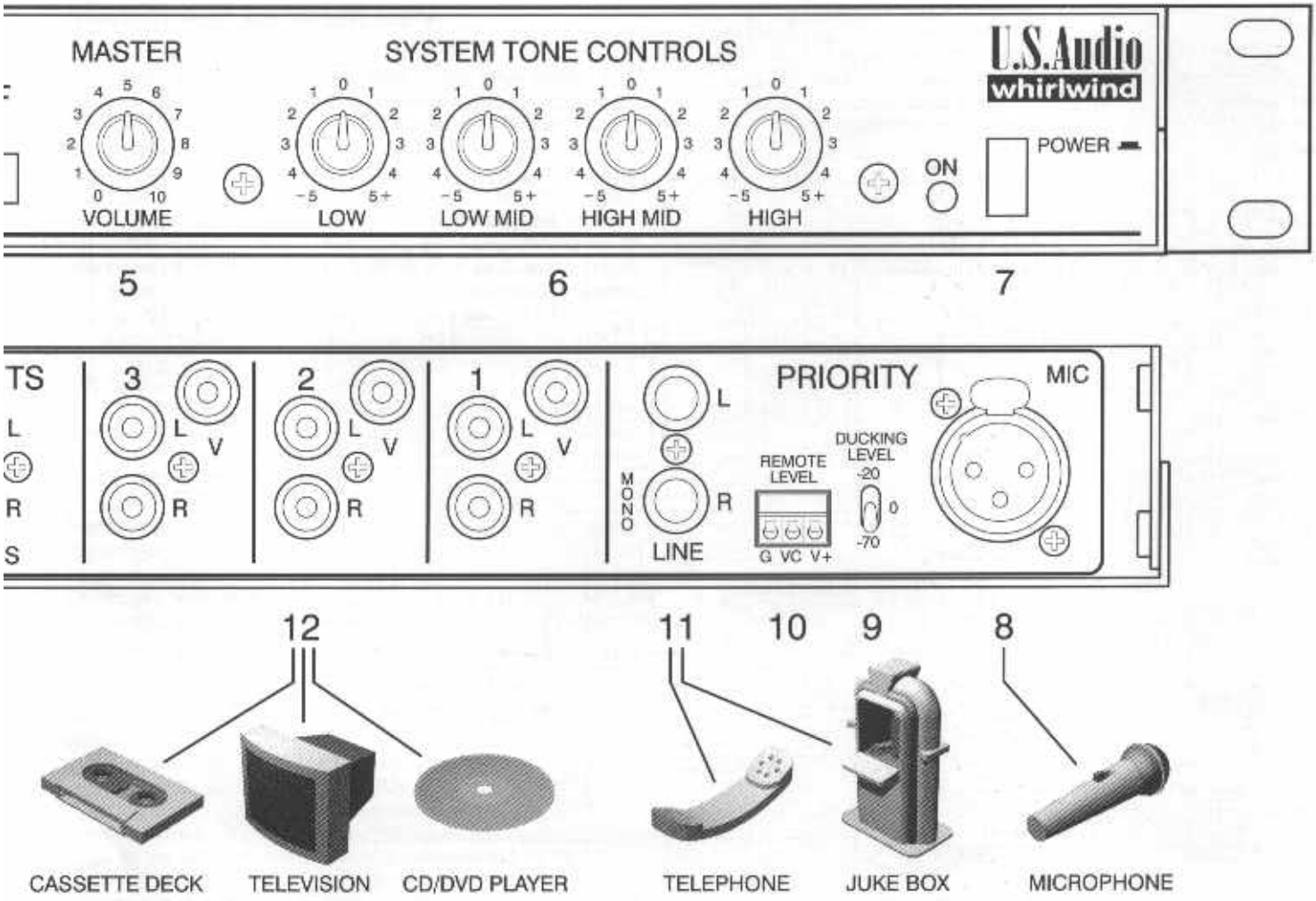
7. POWER SWITCH turns on the MPM
indicator.

8. PAGING MIC INPUT is a female XL
signals and feeds them to the priority
threshold detector. 18 VDC phantom pov
microphones.

9. DUCKING LEVEL SWITCH sets th
paging mic is in use . In the 0 position, the
together with no change in the normal
reduced by 20 dB and at -70 the normal
the page mic audio signal.

10. REMOTE LEVEL CONNECTION allo
whirlwind part # MPM1RV, to control th
location. V+ is supply voltage to the full
voltage from the wiper of the pot and G is

11. LINE PRIORITY INPUT is balanced
line level signals and feeds them to the
override threshold detector.



ng the tonality of a sound system
HIGH are bass and treble shelving
set at 250 Hz and 1.6 kHz.

ver and illuminates the LED power

which accepts balanced mic level
circuits and to the priority override
utomatically supplied for condenser

unt of volume reduction when the
al signal and the page mic are mixed
l level. At -20 the normal signal is
is effectively turned off leaving only

nnection of a 10 k Ohm linear pot kit,
all level of the MPM1 from a remote
er clockwise terminal. VC is control
d.

¼" which accepts stereo or mono
ty audio circuits and to the priority

12. INPUT JACKS 1,2 and 3 are stereo RCA unbalanced inputs which feed signal to the front panel volume controls and switches. The MPM1V provides composite video RCA inputs in addition to the audio inputs.

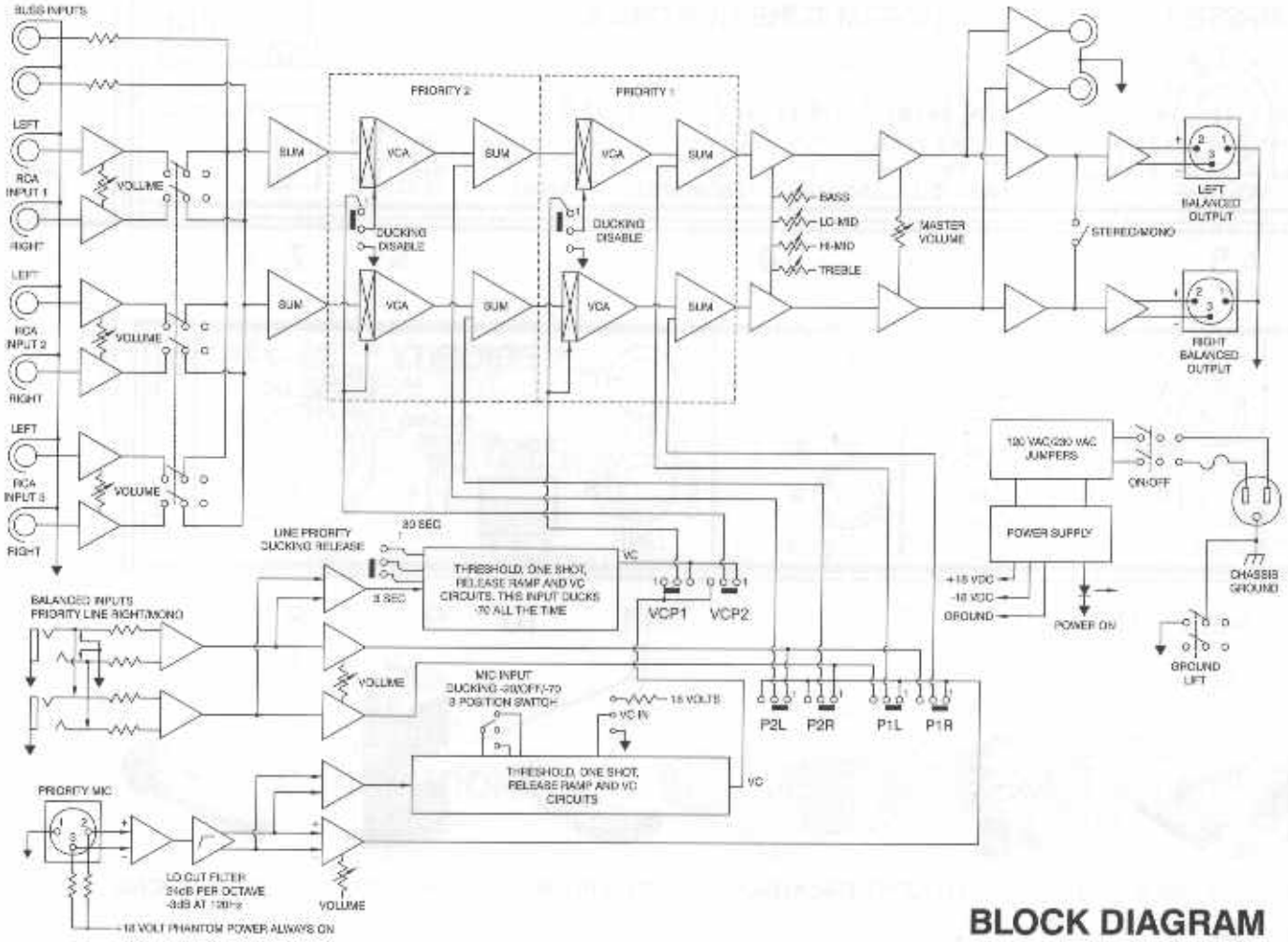
13. BUSS INPUT JACKS are stereo RCA unbalanced inputs which insert signal directly on the audio sum buss of the mixer. The Priority circuits and the Master Volume control this input.

14. UNBALANCED LINE OUTPUT JACKS are stereo RCA jacks that always provide a stereo master output signal regardless of the position of the stereo mono switch. The MPM1V composite video RCA output is also located here.

15. STEREO MONO OUTPUT SELECT SWITCH feeds mono signal to both balanced outputs when Mono is engaged.

16. BALANCED OUTPUT JACKS are male XLR, with pin 2 positive, that deliver the master output signal to the sound system amplifiers. Signal is line level and can be stereo or mono.

17. EARTH LIFT SWITCH disconnects the AC chassis ground from the audio common and is sometimes useful in reducing hum.



BLOCK DIAGRAM

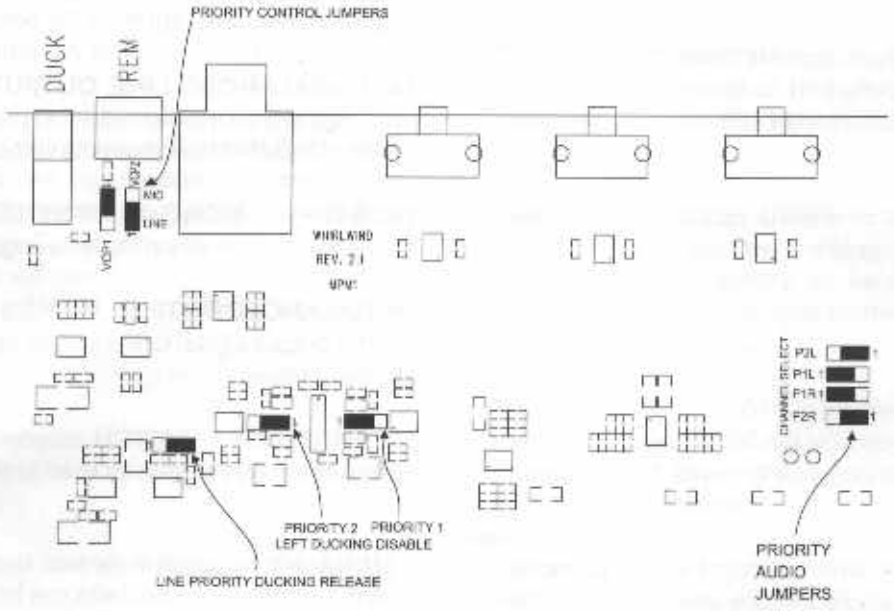
JUMPER LOCATION

Unplug the AC cord of the unit. Remove the four screws on the top right and left sides and loosen the four screws on the bottom left and right sides. The top cover can now be removed by lifting straight up. The jumpers are located behind and to the left of the select switch. Pin 1 of each jumper is labeled as shown. The four priority audio jumpers (P1L, P2L, P1R, P2R) and two priority control jumpers (VCP1, VCP2) are shown in the default position with the paging mic having top priority and the line input having priority 2. To reverse this, change all 6 jumpers from pin 1 and 2, to pins 2 and 3.

The line priority ducking release time jumper is shown in the default position of 3 seconds with pins 2 and 3 connected. To lengthen the release time to 30 seconds, change the jumper to pins 1 and 2.

Jumpers for left channel ducking disable are shown in the default position with ducking active. To defeat this feature for either priority 1 or priority 2 or both, change the appropriate jumpers from pin 1 and pin 2 to pins 2 and 3. Remove jumper P1L and P2L completely to remove the priority audio from the left channel audio output.

Double check all jumpers for proper positioning. Place the top cover back on the unit. Start all four of the top screws before tightening all eight screws.



SPECIFICATIONS

Frequency Response	
RCA Inputs and	+.05 dBm at 20 Hz to -1.3 dBm at 20 kHz
Line Inputs	±or - 3dBm 3 to 30 kHz
Input Impedance	
RCA Inputs 1-3	10 k ohms unbalanced
Mic Input	1.2 k ohms balanced
Priority Line	20 k ohms balanced
Buss Input	20 k ohms unbalanced
Maximum Input Level	
RCA Inputs 1-3	+23 dB unbalanced
Priority Mic	-5 dB balanced
Priority Line	+23 dB balanced
Buss Input	+23 dB unbalanced
Output Impedance	
RCA Outputs	100 ohms unbalanced
XLR Outputs	100 ohms balanced
Maximum Output Level	
RCA Outputs	+23 dB
XLR Outputs	+23 dB
T.H.D.	
RCA In/RCA Out	.06% at 1K Hz unity gain
Mic In/RCA Out	.05% at 1K Hz 40 dB gain
Rise Time	12 uS
Priority Mic Ducking Threshold	-40 dB
Priority Line Ducking Threshold	-20 dB
Release Time	
Mic Priority	5 seconds
Line Priority	3 seconds (Normal) 30 seconds (Slow)
Range of Level Pots	-60 to +20 dB
Common Mode Rejection	
Mic Input	>50 dB at 50 Hz
Gain Mic Input	-40 to +45 dB
Stereo Separation	>60dB
Equalizer Gain/Cut	
Bass	25 dB at 20 Hz
Lo Mid	14 dB at 250 Hz
Hi Mid	14 dB at 1.6 K Hz
High	15 dB at 10 K Hz
(See Response Plot)	
Signal to Noise Ratio at Unity Gain	
RCA in to RCA out	76 dB
Range of Remote Volume	45 dB
Power Consumption	.2 Amps AC Maximum
Size	
Width	19" with rack mount ears 17 3/8" without rack mount ears
Height	2 1/8" with rubber feet 1 13/16" without rubber feet
Depth	6" from front of knobs to back connectors 5 ¼" rack depth mount
Weight	7 ¼ pounds

SYSTEM TONE CONTROL FREQUENCY RESPONSE